consisting of Fe, Co, Mn, Ni, and Mo, said gaseous catalyst precursor stream being provided at a temperature below the decomposition temperature of said catalyst precursor;

(c) heating said CO gas stream to a temperature that is (i) above the decomposition temperature of said catalyst precursor and (ii) above the CO decomposition initiation temperature, to form a heated CO gas stream; and

(d) mixing said heated CO gas stream with said gaseous catalyst precursor stream to rapidly heat said catalyst precursor to a temperature that is (i) above the decomposition temperature of said catalyst precursor, (ii) sufficient to promote the rapid formation of catalyst metal atom clusters and (iii) sufficient to promote the initiation and growth of single wall nanotube by the CO decomposition reaction, to form a suspension of single wall carbon nanotube products in the resulting gaseous stream.

25. The method of claim 24 further comprising the step of separately recovering said single wall carbon nanotube products from said resulting gaseous stream.

26. The method of claim 24 wherein said catalyst precursors is a metal-containing compound of a metal selected from the groups consisting of molybdenum, iron, nickel, cobalt, and manganese.

27. The method of claim 26 wherein said metal-containing compound is a metal carbonyl.

28. The method of claim 27 wherein said metal carbonyl is selected from the group consisting of $Fe(CO)_5$ or $Mo(CO)_6$ and mixture thereof.

29. The method of claim 24 wherein said CO gas stream is provided at a pressure of about 0 p.s.i.g. to about 100 p.s.i.g.

30. The method of claim 24 wherein said gaseous catalyst precursor stream is supplied in a CO gas stream.

31. The method of claim 30 wherein the partial pressure of said catalyst precursor in said high pressure CO gas stream is from about 0.25 Torr to about 100 Torr.

32. The method of claim 24 wherein said gaseous catalyst precursor stream is supplied at a temperature in the range of from about 70°C to about 80°C.

33. The method of claim 24 wherein said CO gas stream is heated to a temperature in the range of from about 400°C to about 1300°C.

34. The method of claim 24 wherein said catalyst precursor is heated to a temperature in the range of from about 400°C to about 1300°C.

35. The method of claim 25 wherein said single wall carbon nanotube products are substantially free of solid contaminants other than catalyst atoms.

36. The method of claim 25 wherein said single wall carbon nanotube products have a tube diameter about 1 nm.

37. The method of claim 24 further comprising the step of controlling the diameter of the single wall carbon nanotube products recovered by controlling the catalyst cluster size at the time the growth reaction is initiated.

38. The method of claim 37 wherein said catalyst cluster size is controlled by controlling the temperature or controlling the vapor pressure of the gaseous catalyst precursor.

39. A single wall carbon nanotube product made by the process comprising the steps of:

(a) providing a CO gas stream;